1. (Original) A measuring apparatus (10) which consists of several assemblies, at least one of which comprises a force and/or moment sensor for measuring of positions or movements of two objects relative to one another, characterized in that it comprises:

– a conversion spring means (20) of biased springs which span an air gap which is defined by a certain distance of a first and a second assembly from a third assembly, with the force and/or moment sensor being elastically connected with one of the objects at least via the conversion spring means (20).

2.(Original) The measuring apparatus (10) according to Claim 1, characterized in that it comprises:

– a force and/or moment sensor with at least

– a first assembly (12) which is connected with one of the two objects,

– a second assembly (14) which is elastically connected with the first assembly (12) by at least one measuring spring means (18), and

– at least one optoelectronic measuring cell for measturing the position or movement of the first (12) relative to the second assembly (14), and

– a third assembly (16) which is connected with the other one of the two objects and which is elastically connected with the second assembly (14) by the conversion spring means (20), with the position of the first assembly (12) relative to the third assembly (16) being changeable from outside, and the second assembly (14) assuming a position relative to the first assembly (12), which depends on the position of the third (16) relative to the first assembly (12).

3. (Amend) The measuring apparatus (10) according to [Claims 1 and 2] Claim 1, characterized in that the third assembly (16) defines an interior space in which the first (12) and the second (14) assembly are arranged in such a manner that they are spaced from the third assembly (16) by the air gap.

4.(Amend) The measuring apparatus (10) according to [one of the previous claims] Claim 3, characterized in that the conversion spring means (20) comprises a helical spring assembly which is preferably arranged in a rotation symmetrical fashion.

5. (Amend) The measuring apparatus (10) according to [one of Claims 2 to 4] Claim 4, characterized in that the measuring spring means (18) comprises one of the following components or combinations thereof: helical spring (assembly), moulded elastomer pert, moulded cast resin part.

6. (Amend) The measuring apparatus (10) according to [one of Claims 2 to 5] Claim 5, characterized in that the measuring spring means (18) comprises three components are of the measuring spring means (18) are preferably arranged in a rotation symmetrical fashion.

7. (Amend) The measuring apparatus (10) according to [one of Claims 2 to 6] Claim 6, characterized in that the first (12) and the second assembly (14) are essentially connected elastically with one another via the components of the measuring spring means (18).

8. (Amend) The measuring apparatus (10) according to [one of Claims 6 to 7] Claim 7, characterized in that the first (12) and the second assembly (14) each comprise a printed circuit board.

9. (Amend) The measuring apparatus (10) according to [one of Claims 6 to 8] Claim 8, characterized in that at least one component of the measuring spring means (18) comprises at least one helical spring which is firmly connected with the first (12) and second assembly (14) by soldering.

10. (Amend) The measuring apparatus (10) according to [one of Claims 2 to 9] Claim 9, characterized by at least one stop means (24) which limits the movement of the first assembly (12) relative to the second assembly (14).

11. (Amend) The measuring apparatus (10) according to [one of Claims 2 to 10] Claim 10, characterized in that it comprises at least [sic] six optoelectronic measuring cells in order to detect movements or positions in six degrees of freedom.

12. (Amend) The measuring apparatus (10) according to [one of Claims 2 to 11] Claim 11, characterized in that the optoelectronic measuring cells are located on the circumference of a circle and are preferably arranged in pairs of measuring cells lying one above the other, and the pairs being preferably arranged in a rotation symmetrical fashion.

13. (Amend) The measuring apparatus (10) according to [one of Claims 2 to 12] Claim 12,

characterized in that each optoelectronic measuring cell comprises a position sensitive detector (30) arranged in the beam path of a light emitting means (32) as well as a slit diaphragm (40) arranged in the beam path of the light emitting means (32) between the light emitting means (32) and the position sensitive detector (30), with the detector axis of the position sensitive detector being oriented perpendicularly to the slit direction of the slit diaphragm (40), and one element of a system consisting of light emitting means (32), slit diaphragm (40), and detector (30) being movable relative to the other two elements.

14. (Original) The measuring apparatus (10) according to Claim 13,

characterized in that the slit diaphragm (40) in each measuring cell is arranged either on the first (12) or on the second assembly (14), and the position sensitive detector (30) and the light emitting means (32) are arranged together on the respective other one of th two previously mentioned assemblies (12, 14).

15. (Amend) A force and/or moment sensor, characterized by the measuring apparatus (10) according to [one of the previous claims] Claim 14.

16. (Amend) A joystick characterized by

– a measuring apparatus (10) according to [one of Claims 1 to 15] Claim 15, or

– a force and/or moment sensor according to Claim 15.

17. (Add) A means for measuring the relative positions or movements of two objects, comprising

– a force and/or moment sensor with a first sensor subunit (12) which is connected with a first one of the objects, as well as a second sensor subunit (14) which is coupled to the first sensor subunit (12) relative to same in a springy fashion by means of a first spring arrangement (18), in the following referred to as measuring spring arrangement, with the two sensor subunits (12, 14) each carrying part of measuring components (30, 32, 40) for measuring of relative positions or movements of the two sensor subunits (12, 14) and

– a second spring arrangement (20), in the following referred to as conversion spring arrangement, which is coupled to the second (16) of the objects relative to same in a springy fashion,

characterized in that the conversion spring arrangement (20) alone is coupled to the second sensor subunit (14) and the second object.

18. (Add) The means according to Claim 17, characterized in that the second object (16) forms an annular body in whose annular interior the force and/or moment sensor is arranged at a distance from the annular body.

19. (Add) The means according to Claim 18, characterized in that conversion spring arrangement (20) is formed by several conversion spring elements evenly distributed arranged in the direction of the annulus circumference, acting in parallel with each other.

20. (Add) The means according to Claim 19, characterized in that the conversion spring elements are formed as helical springs.

21. (Add) The means according to Claim 20, characterized in that the helical conversion springs are installed so as to be biased.

22. (Add) The means according to Claim 21, characterized in that the helical conversion springs extend radially with respect to an annulus axis of the annular body (16).

23. (Add) The means according to Claim 22, characterized in that the conversion spring arrangement (20) comprises a total of three conversion spring elements.

24. (Add) The means according to Claim 23, characterized in that in that the two sensor subunits (12, 14) each comprise a carrier disk for mounting at least parts of the measuring components, and that the two carrier disks are arranged axially spaced one above the other with respect to the annulus axis of the annular body (16) and coupled to each other by the measuring spring arrangement (18).

25. (Add) The means according to Claim 24, characterized in that the measuring components (30, 32, 40) of the force and/or moment sensor form six optoelectronic measuring cells for the detection of relative positions or movements of the two objects in six degrees of freedom, with each measuring cell being formed by an arrangement of a light emitting diode (32), a position sensitive detector (30), and a slit diaphragm (40) arranged in the beam path between the diode and the detector, with an axis of the detector being arranged perpendicularly to the slit direction of the slit diaphragm, and with one of the components: diode, detector, and slit diaphragm being arranged at one of the two sensor subunits (12, 14) while the two other ones of these components are arranged at the other sensor subunit.

26. (Add) A joystick with a measuring means according Claim 25.